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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,613	10/23/2003	Christopher Douglas Moffatt	HAR62 014	5924

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EXAMINER	
LUGO, DAVID B	

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/690,613	MOFFATT ET AL.	
	Examiner	Art Unit	
	DAVID B. LUGO	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 December 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/8/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection.

2. Regarding claims 11-13, the Examiner apologizes for failing to include the consideration of those claims in the previous Office action. Claims 11-13 are considered below.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 3-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Corral U.S. Patent 6,925,128 in view of Feng et al. U.S. Patent Application Publication 2004/0146115 (previously cited).

Regarding claims 3 and 8, Corral disclose a method of transmitting data in a multi-carrier communication system (see Fig. 7) comprising sequencing data according to one or more unique sequences in by reordering elements (step 706) which creates a plurality of candidate input vectors (col. 11, lines 29-31), modulating one of the unique sequences of data (step 708), and selecting one of the modulated sequences of data based on the PAPR of that sequence (step 712) as a selector selects a sequence that has desired selection criteria, namely a PAPR below a predetermined threshold (col. 10, lines 57-67). Corral, further discloses that clipping can be combined with other PAPR methods (col. 5, lines 5-7). However, Corral does not expressly disclose filtering the selected sequence to remove amplitude peaks outside a threshold band to create a filtered signal, and transmitting the filtered signal.

Feng discloses a PAPR reduction approach where the amplitude levels of the transmitted signal exceeding a threshold is reduced, and the reduced signal is subsequently filtered prior to transmission (para. 10). It would have been obvious to one of ordinary skill in the art to combine the teachings of Feng with the method of Corral to provide further PAPR reduction which when combined, can offer advantages in terms of reducing hardware complexity (see Corral, col. 5, lines 5-7).

Regarding claims 4 and 9, as disclosed by Feng, filtering includes comparing the amplitude levels to a threshold and reducing the amplitudes exceeding the threshold. Further, Corral discloses that digital samples of the signal are output from processor 108 (see col. 9, lines 43-48). One of ordinary skill in the art would recognize that the comparison of Feng may be made in the digital domain using samples as a matter of design consideration.

Regarding claims 5 and 10, one of ordinary skill in the art would recognize that the filtering operation of Feng would also result in the some attenuation of adjacent samples.

Regarding claim 6, Corral disclose a method of preventing limiting of a linear amplifier in a multi-carrier communication system (see Fig. 7) comprising sequencing data according to one or more unique sequences in by reordering elements (step 706) which creates a plurality of candidate input vectors (col. 11, lines 29-31), and modulating one of the unique sequences of data (step 708). Corral discloses that digital samples of the signal are output from processor 108 (see col. 9, lines 43-48). Thus, samples are provided at the output of processor 108 (Fig. 1). Accordingly, the step of sampling the modulated sequenced data is deemed a design consideration that fails to patentably distinguish over the prior art of Corral, as Corral also provides a sampled output for further processing. Corral, further discloses that clipping can be

combined with other PAPR methods (col. 5, lines 5-7). However, Corral does not expressly disclose reducing amplitudes of samples outside a predetermined threshold, and transmitting the resultant signal.

Feng discloses a PAPR reduction approach where the amplitude levels of the transmitted signal exceeding a threshold is reduced, and the reduced signal is subsequently filtered prior to transmission (para. 10). It would have been obvious to one of ordinary skill in the art to combine the teachings of Feng with the method of Corral to provide further PAPR reduction which when combined, can offer advantages in terms of reducing hardware complexity (see Corral, col. 5, lines 5-7).

Regarding claim 7, one of ordinary skill in the art would recognize that the filtering operation of Feng would also result in the some attenuation of adjacent samples.

Regarding claim 11, Corral discloses a transmitter in Fig. 1 in a multi-carrier communications system for transmitting data with multiple carriers comprising a modulator 108 for modulating multi-carrier symbols with the data (col. 9, lines 35-41), a processor (calculator 204 – Fig. 2) for measuring the peak-to-average power ratio of the modulated data (col. 10, lines 20-23), a logic device (comparator 114) for comparing the peak-to-average-power ratio with a predetermined threshold, and a processor (reorderer 104) for resequencing the data. Corral also discloses that clipping can be combined with other PAPR methods (col. 5, lines 5-7), but does not expressly disclose an amplitude filter for reducing peaks of the modulated data signal that are outside a predetermined range.

Feng discloses a PAPR reduction approach where the amplitude levels of the transmitted signal exceeding a threshold is reduced, and the reduced signal is subsequently filtered prior to

transmission (para. 10). It would have been obvious to one of ordinary skill in the art to combine the teachings of Feng with the method of Corral to provide further PAPR reduction which when combined, can offer advantages in terms of reducing hardware complexity (see Corral, col. 5, lines 5-7).

Regarding claims 12 and 13, FIR and IIR filters are well known in the art of digital filtering. One of ordinary skill in the art would recognize that FIR or IIR filters may be implemented in the filter of Feng as a matter of design consideration.

5. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weerackody U.S. Patent 6,950,389 in view of Shattil U.S. Patent Application Publication 2004/0141548 and Feng et al.

Regarding claim 1, Weerackody discloses a method of peak-to-average power reduction where data at random phases are modulated in IFFT 105, which is considered to modulate a first plurality of carrier waves at a second plurality of frequencies with the data signal to create a modulated data signal, measuring the PAPR of the modulated signal (Fig. 4 – step 403, see col. 4, lines 26-34), comparing the power ratio with a predetermined threshold (step 404), if the power ratio exceeds the threshold, selecting a new data signal (step 407) and repeating the modulating measuring comparing steps until the power ratio does not exceed the threshold (col. 1, line 66 to col. 2, line 2), if the power ratio does not exceed the threshold, transmitting the signal (col. 1, lines 63-65). Thus, Weerackody discloses the use of phase rotation to reduce PAPR, but does not disclose that the data is sequenced according to a data vector to create a sequenced data signal, whereby a new data sequence is generated if the power ratio exceeds the predetermined threshold, and a map signal associated with the selected data vector is appended

to the modulated signal when the power ratio does not exceed the threshold to create a sampled appended signal.

Shattil discloses a method of sequencing of data, which is closely related to the phase rotation technique, for reducing the PAPR of a signal where different data sequences for a given data block are generated, and the sequence having the lowest PAPR is selected for transmission, where control signal overhead is required to inform the receiver of changes to the transmission signal, which is considered an appended signal (see Shattil, para. 8). It would have been obvious to one of ordinary skill in the art to substitute the data sequencing technique of Shattil in place of the phase rotation technique used in the method of Weerackody because one of ordinary skill in the art would recognize that the techniques are closely related (see Shattil, para. 8) and are both used to reduce PAPR, which would allow substitution of the methods to provide a predictable result. Further, one of ordinary skill in the art would recognize that the appended signal may be sampled as a matter of design consideration.

Weerackody does not expressly disclose reducing the amplitudes of samples which exceed a predetermined range to create a reduced amplitude signal, and filtering the reduced amplitude signal. However, it is well known in the art to combine clipping with other PAPR methods. Further, Feng discloses a PAPR reduction approach where the amplitude levels of the transmitted signal exceeding a threshold is reduced, and the reduced signal is subsequently filtered prior to transmission (para. 10). It would have been obvious to one of ordinary skill in the art to combine the teachings of Feng with the method of Weerackody to provide further PAPR reduction.

Regarding claim 2, one of ordinary skill in the art would recognize that the filtering operation of Feng would also result in the some attenuation of adjacent samples.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID B. LUGO whose telephone number is (571)272-3043. The examiner can normally be reached on M-F; 9:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3066. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David B. Lugo/
Primary Examiner, Art Unit 2611
4/10/08